Barrel TRT
Straw Leak Test

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Straw Leak Testing

- This is a bottle-neck in production, at five minutes/straw
- PRR requested automation
- A study with a one-straw and a two-straw manual system gives the time taken for N straws tested manually as (4+N) minutes. If some aspects are automated, this may go to (3.5+0.5N) minutes.

Production per shift

120/shift meets schedule, 240/shift capability is desired

No. of straws tested/cycle	Manual	Automated
1	72	90
2	120	160
4	180	260
8	240	380

Production rates

- Steps are (automated in parentheses)
  - Mount, 0.5 min/straw
  - Pressurize, wait for equilibrium, 3 mins
  - Record trend, 0.5 min/straw (0.5 min/cycle)
  - End effects, 1 min/cycle (0.5 min/cycle)

Status

- Multiple-straw leak tester under development
- Steps (currently manual) to be automated
  - Control of sealing actuators
  - Adjustment of test pressure (200 mbar)
  - Control of straw close-off valve
  - Timing of cycle
  - Recording of differential pressure trend

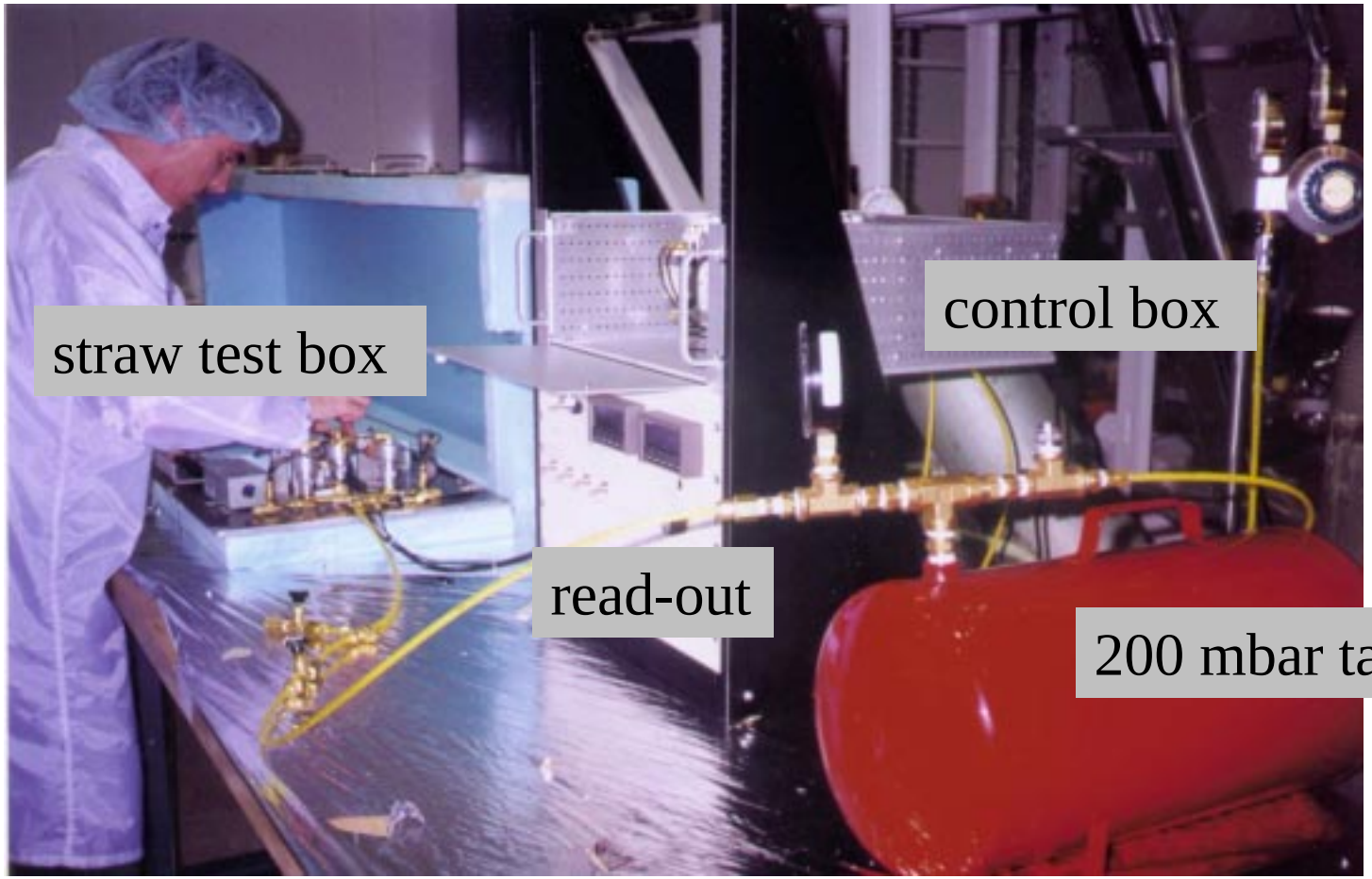
Steps to automation

- Pneumatic operation of all valves (done)
- Electrical operation of pneumatics (done)
- Logic level control of electrical operation
- Computer-generated logic sequence
- Computer acquisition of parameters, with display for operator
- Recording in database

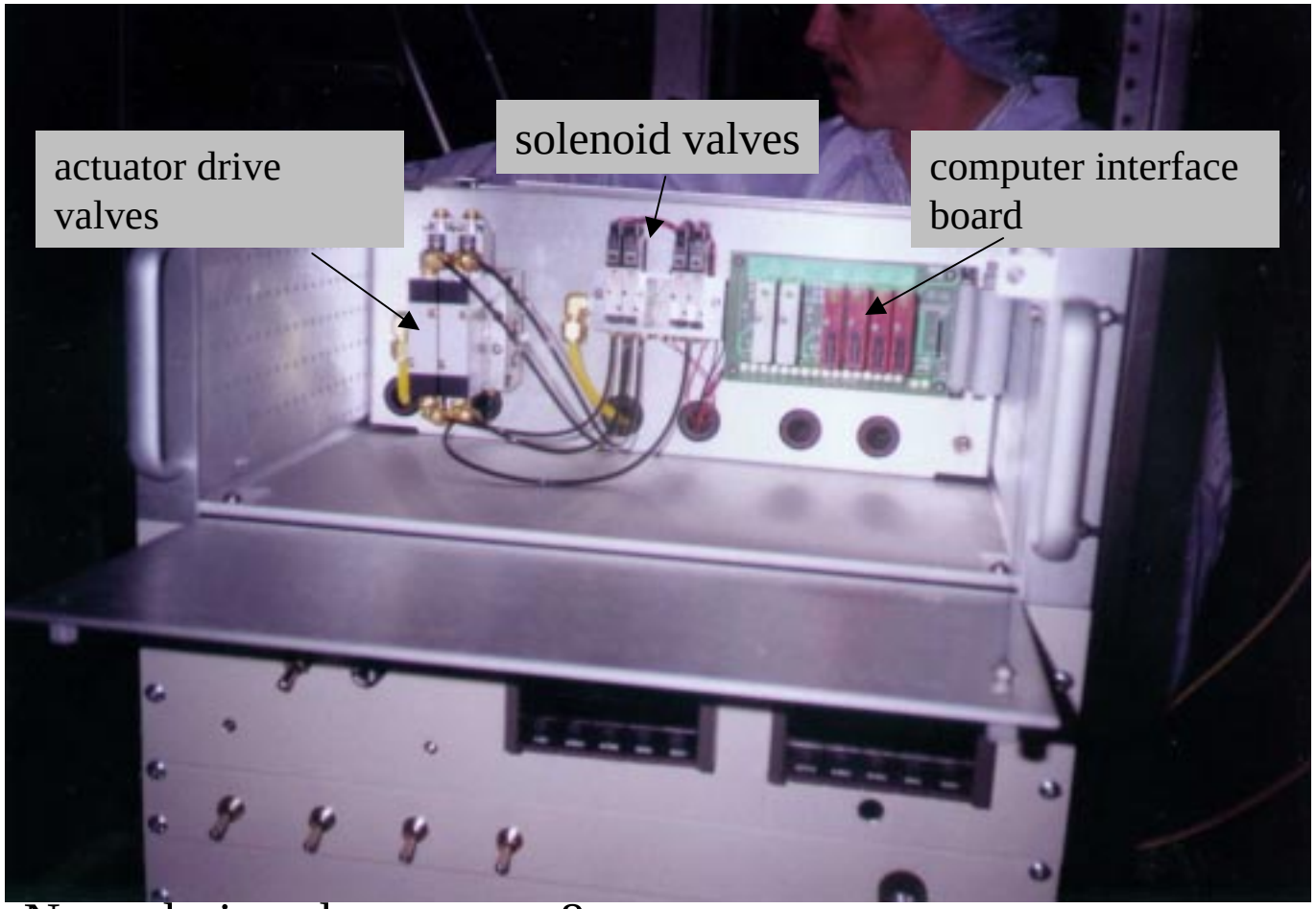
Development steps

- Two-straw manual system (done)
- Two-straw system, electrical control (done); logic level control minor step
- Four-straw system, logic level control (human recording)
- Four-straw system, computer control and pass/fail indication
- Four-straw system, database input, SPC

Two-straw, electrical control

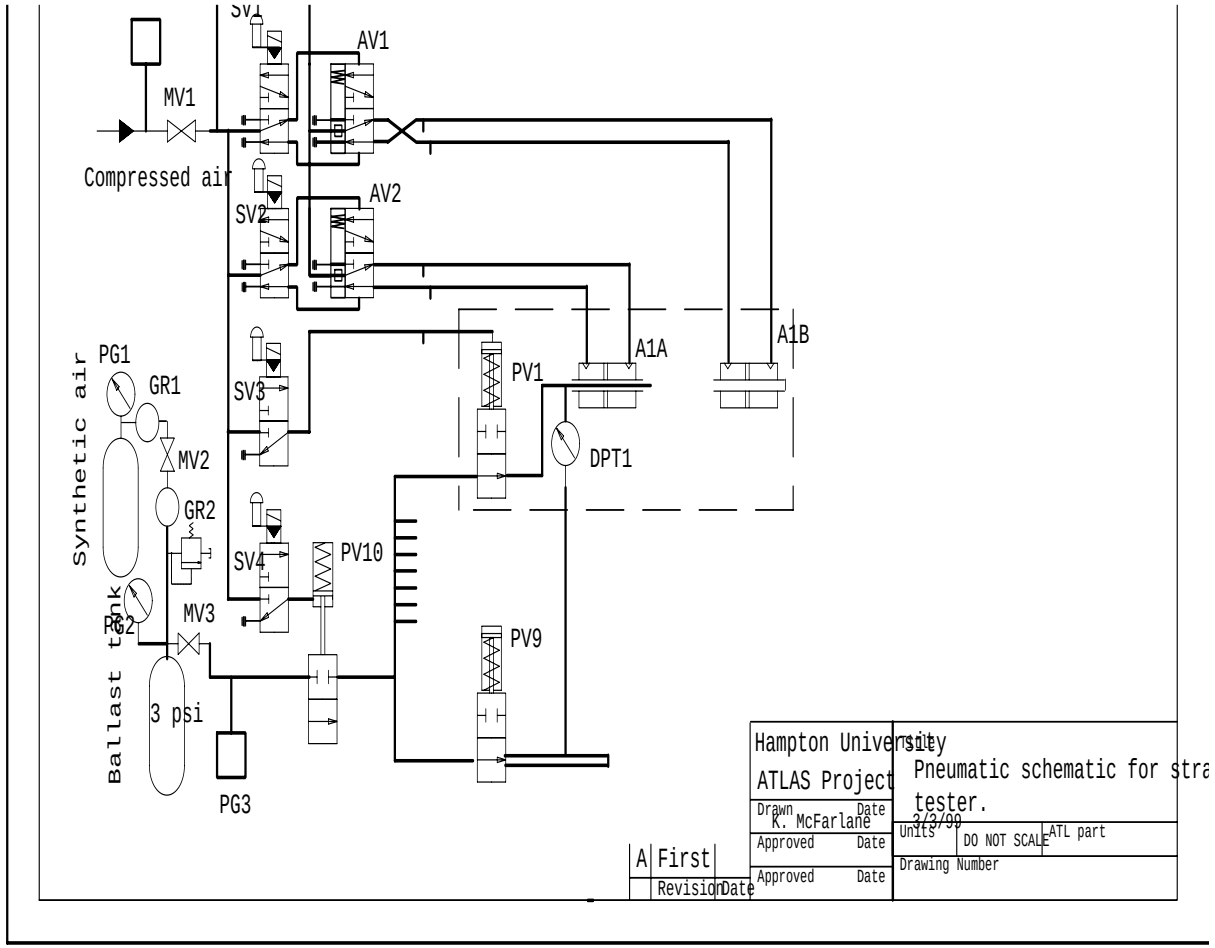


Leak Test Control Box



Note: designed to operate 8 straw system

Pneumatic Schematic



Schedule

- Two-straw system done
- Four-straw with computer control, recording August, 1999.